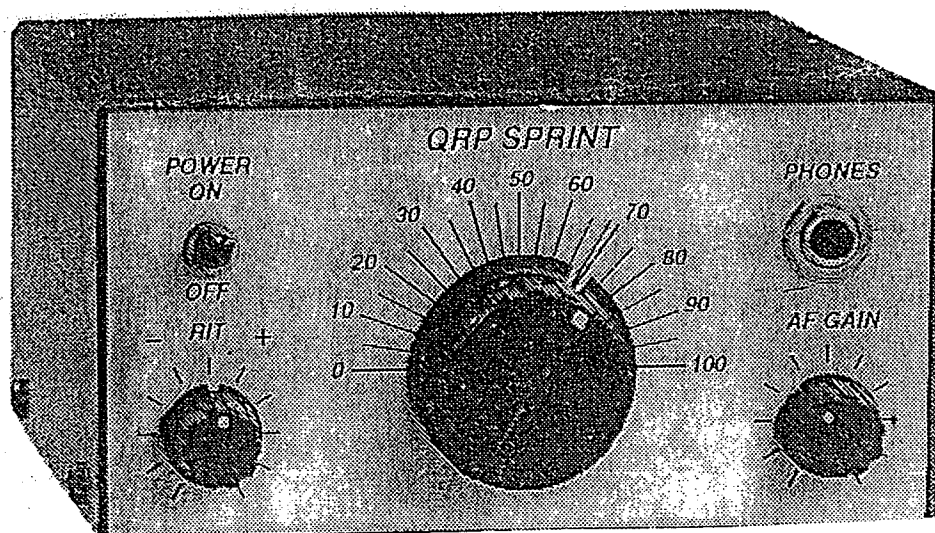


# ASSEMBLY INSTRUCTIONS

## QRP SPRINT 40M



Oak Hills Research  
20879 Madison Street  
Big Rapids, MI 49307

AUG 1977  
AG5P



now K5EST

QRP SPRINT NON-LINEAR DIAL SETTINGS

0 = 7.000  
10 = 7.006  
20 = 7.012  
30 = 7.020  
40 = 7.028  
50 = 7.037  
60 = 7.047  
70 = 7.059  
80 = 7.073  
90 = 7.087  
100 = 7.099  
  
71 = 7.060  
53 = 7.040

FREQ CALIBRATION  
8-8-94

KIT COMPLETED &  
ON THE AIR.

WD  
AG5P

## INTRODUCTION

Thank you for purchasing the QRP Sprint Transceiver kit. The Sprint is a single band CW transceiver offered for the 80M, 40M and 30M band. It features a high performance DC receiver with diode ring mixer, double-tuned band-pass filter, and an improved audio output network. Some other features included in the Sprint are: Very stable VFO w/RIT providing 100 KHz coverage on each band (50 KHz on 30M), an on board audio filter, sidetone oscillator, very smooth QSK circuit and 1.5W of RF output power. The Sprint draws a mere 40mA on receive and 240mA on transmit making it excellent for battery powered operation. The transceiver is constructed on a single, double-sided PC board with plated-thru holes and component screen. There are no jumpers to install on the board. There is room inside the cabinet to install the optional Key 1 Iambic keyer kit. The alignment is very easy to perform and requires only a 10MHz frequency counter and a QRP wattmeter with 50 ohm load.

You will need the following tools to assemble your kit: normal hand tools which include long-nose pliers; diagonal cutters; GOOD wire strippers; phillips screwdriver; pliers; .050" Allen wrench; 22 to 25 watt pencil soldering iron; alignment tool; ruler; supply of ROSIN CORE solder. A desoldering bulb and desoldering braid are also helpful to have.

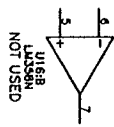
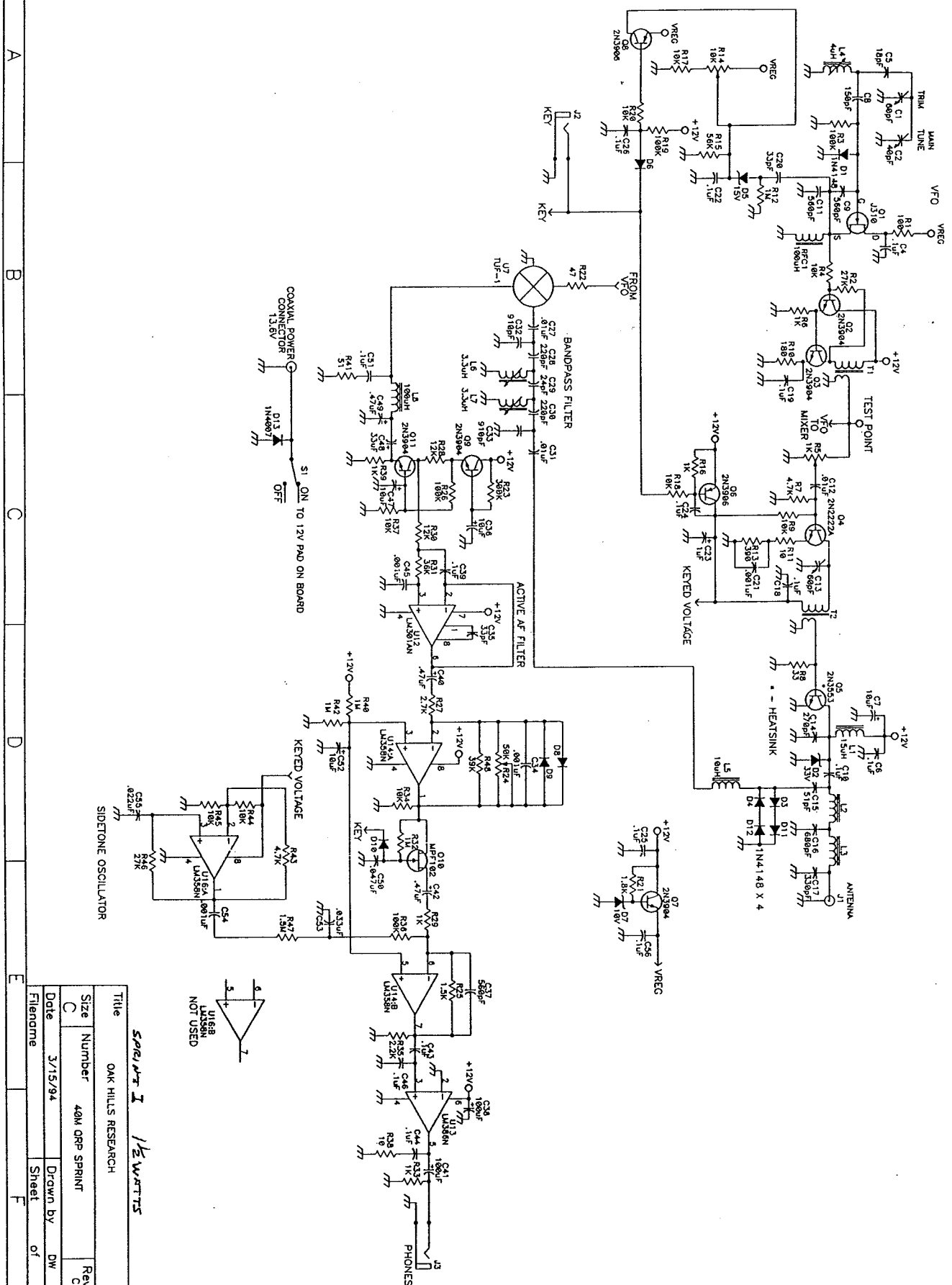
Soldering is one of the most important operations you will perform while assembling your kit. About 95% of all kits returned to us for repair have problems caused by poor soldering. A good solder connection will form an electrical connection between two parts, such as a component lead and a circuit board foil. A bad solder connection could prevent an otherwise well-assembled kit from operating properly. It is easy to make good solder connections if you follow a few simple rules. Use the correct type of soldering iron. A 22 to 25-watt pencil soldering iron with a 1/8" or 3/16" chisel tip works best. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned. ALWAYS use ROSIN CORE, radio-type solder (60:40 tin-lead content) for all of the soldering in this kit. The Warranty will be void and we will not service any kit in which acid core solder or paste has been used.

The PC board supplied in this kit is double-sided with plated-thru holes and component screen. We have included a blown-up diagram of the component screen of the board, and a schematic diagram. These will help locate components. When you assemble the PC board, BE ABSOLUTELY SURE YOU HAVE THE CORRECT COMPONENT IN THE CORRECT LOCATION BEFORE SOLDERING IT IN PLACE! DOUBLE CHECK YOUR WORK BEFORE SOLDERING! With plated-thru holes, once you have soldered a component in place, and then want to remove it, it is much more difficult. If you do make a mistake and want to remove a component, follow this simple procedure: Use your desoldering bulb and your desoldering braid to remove ALL solder from the hole. Make sure the component leads are loose and free in the hole before removing the component.

## ASSEMBLY

- ✓ 1) Start assembly of your kit by unpacking the components. Do not remove the marked components packaged in separate bags until ready to install them. Use the parts list to check off the parts. Some components are supplied on a tape. Do not remove these components by pulling them from the tape. Use your diagonal cutters to cut the component leads flush with the edge of the tape. Pulling the component leads from the tape will damage the component.
- ✓ 2) Place the PC board in front of you with the component side up. All components will be installed from this side of the board. Refer to the oversized component screen sheet and the parts list to locate components and their values.
- ✓ 3) Start installing the resistors first, followed by the capacitors. Insert the component leads through the correct holes and then bend the leads slightly to hold them in place. Install four or five components at a time and then turn the board over and solder each lead. Trim the excess lead length with your diagonal cutters. Hold the piece to be cut off between your fingers and cut. This will prevent a cut off lead from flying up and hitting you in the eye. Again, be sure you have the components in the correct holes before soldering. When installing the electrolytic capacitors, be sure to observe the correct polarity. The long lead is ALWAYS positive. (Don't forget the special procedure on the negative lead of C49. See page 1.) Continue installing resistors and capacitors until all are installed. Don't work too long at one time. Take frequent breaks. NOTE: Capacitor C3 is NOT used on 40M.
- ✓ 4) Install the 33V zener diode at D2. Be sure to position the banded end as shown. Solder and trim.
- ✓ 5) Install the 15V zener diode at D5. Solder and trim.
- ✓ 6) Install the 10V zener diode at D7. Solder and trim.
- 7) Install the remaining diodes. Position banded end as shown. Solder and trim.
- ✓ 8) Install the ORANGE trim caps at C1 and C13.
- ✓ 9) Install the 15uH choke at L1. This choke is mounted in the vertical position.
- ✓ 10) Install the remaining chokes at L5, L8 and RFC1.
- ✓ 11) Install the 1K trim pot at R5.
- ✓ 12) Install the TUF-1 mixer at U7.
- ✓ 13) Slide the white component spacer onto the leads of the 2N3553 transistor. Install at Q5. Position the transistor down against the top of the board and solder. Trim the leads. Slide the red heatsink onto the transistor.

NOTE:  
C3 NOT USED ON 40M

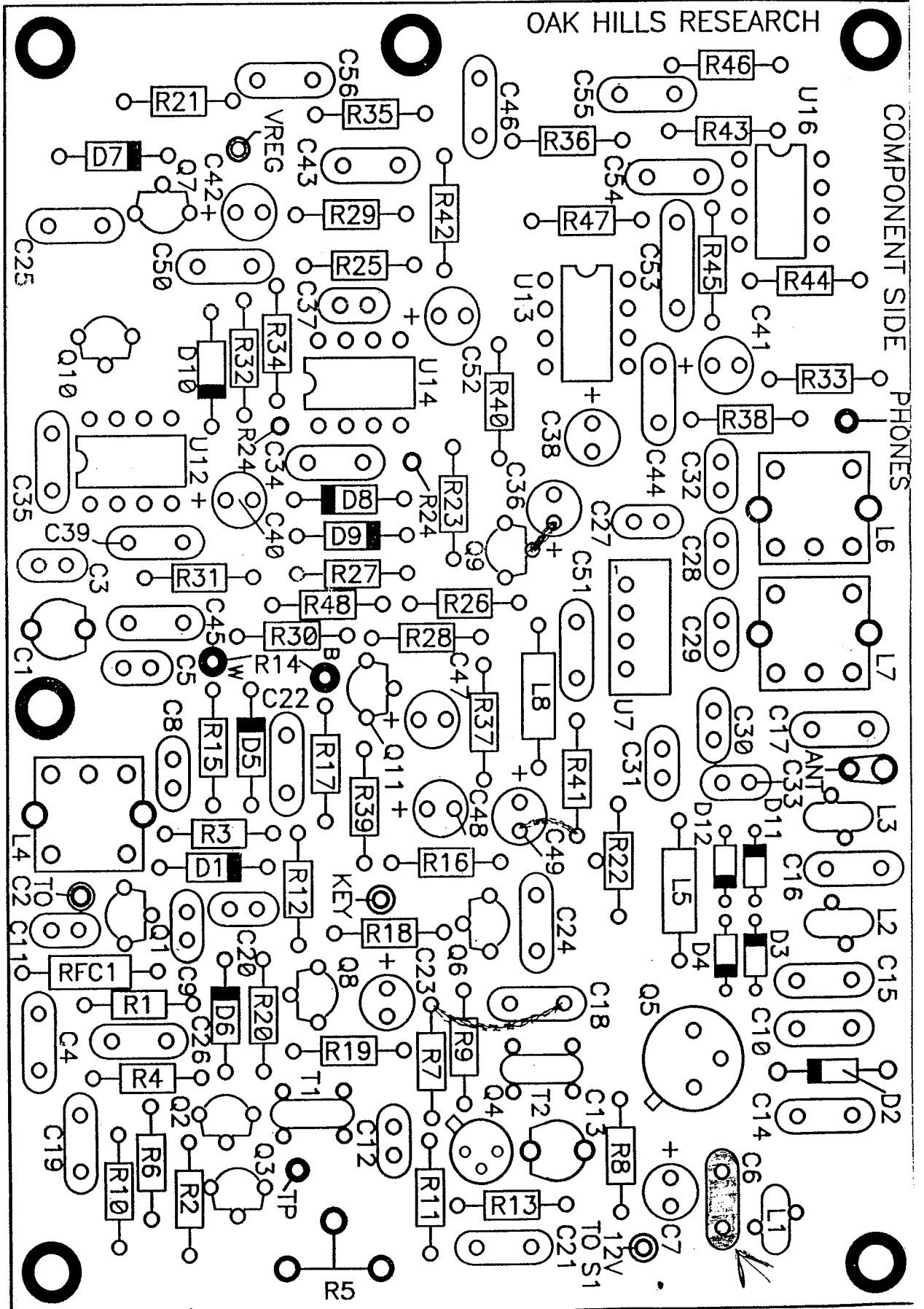


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		of	

COMPLETED 8-7-94 AGSP

OAK HILLS RESEARCH

COMPONENT SIDE PHONES



## ASSEMBLY (CONT)

- ✓ 14) Install the 2N2222A transistor at Q4. Position tab as shown. Leave transistor about 1/16" above the top of the board. Solder and trim leads.
  - ✓ 15) Install a 2N3906 transistor at ~~Q6~~ and ~~Q8~~. Position the flat side as shown. Leave the transistors about 1/8" to 1/4" above the board. Solder and trim leads.
  - ✓ 16) Install the J310 transistor at Q1. Solder and trim leads.
  - ✓ 17) Install the MPF102 transistor at Q10. Solder and trim leads.
  - ✓ 18) Install a 2N3904 transistor at ~~Q2~~, ~~Q3~~, ~~Q7~~, ~~Q9~~ and ~~Q11~~. Solder and trim leads.
  - ✓ 19) Remove transformer T1 from its package. Notice the transformer has a RED primary winding and a GREEN secondary winding. Insert the two RED primary leads into the holes closest to Q2 and the GREEN secondary leads into the holes closest to C12. Pull the leads slightly on the solder side to remove any slack in the windings. Solder and trim.
  - ✓ 20) Using the same procedure, install transformer T2. The RED primary winding leads go into the holes closest to Q4 and the GREEN secondary leads go into the holes closest to Q5. Solder and trim leads.
  - ✓ 21) Install the two remaining toroid coils at L2 and L3. Solder and trim leads.
  - ✓ 22) Install the variable inductor with the HEX tuning slug at L4. Solder all five pins plus the ground tabs.
  - ✓ 23) Install the two remaining variable inductors at L6 and L7. Solder all five pins plus the ground tabs.
  - ✓ 24) Install 8 pin IC sockets at U12, U13, U14 and U16. It is best to install these sockets one at a time. Solder each pin on each socket. Take your time, as it is very easy to create a solder bridge between two pins.
  - ✓ 25) At this time, all components should be correctly installed and soldered. Carefully check the board for proper solder connections and solder bridges. Don't just gloss over this step. Take the time and do it. This may save you a lot of frustration and expense when its time to align your radio. About 98% of all kits we get back for troubleshooting have at least one solder bridge. Take the time to check your work!
- ✓ NOTE: There is an unused hole just below R22. This is a via used to feed a signal from the top of the board to the bottom. Nothing is installed in this hole.

## ASSEMBLY (CONT)

26) In the following step you will prepare various lengths of wire and cable. To prepare a wire, remove 1/4" of insulation from each end. To prepare a length of coax cable, carefully remove 3/4" of the black outer jacket. Be very careful not to cut into the braid. Comb the braid out and twist to form a lead. Remove 1/4" of inner insulation. Carefully tin the braid and inner conductor without overheating the cable. Repeat at opposite end. In preparing these wires and cables, you MUST use a good quality pair of wire strippers to avoid cutting into the wire strands. Cutting into or nicking the wire strands will cause the wires to break. DO NOT USE A KNIFE, DIAGONAL CUTTERS OR RAZOR BLADE TO REMOVE INSULATION!

27) Locate the length of 8 conductor cable. Use your diagonal cutters to cut the grey jacket back an inch or so to expose the ends of the wires. Pull the wires out of the jacket. Discard the jacket.

28) Cut the wires to the following lengths:

BLACK - 5"

BROWN - 6 1/2"

RED - 7"

ORANGE - 3"

GREEN - 6 1/2"

BLUE - 5"

YELLOW - 5"

WHITE - 5"

WHITE - 1"

LARGE RED - 1 1/4"

29) Install the wires on the component side of the board at the following locations:

5" BLK at R14-B (Located near R17)

6 1/2" BRN at R24 (Must go to hole near R23)

7" RED at 12V TO S1 (Located near C7)

3" ORG at VREG (Located near C42)

6 1/2" GRN at R24 (Located near R34)

5" BLU at R14-W (Located near C5)

5" WHT at KEY (Located near R18)

1" WHT at TP (Located near Q3) Bend free end into a loop

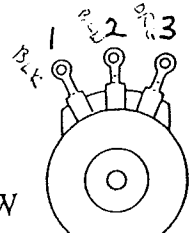
1 1/4" LRG RED at TO C2 (Located near L4)

30) Prepare an 8" and 2" length of BLACK coax cable. Install the 2" cable at "ANT". (Located near C17). The inner conductor goes in the smaller hole and the braid in the larger hole. The free end will be connected later. At one end of the prepared 8" coax cable, cut 1/4" of the braid off. Connect this end to the SOLDER SIDE of the board at "PHONES". Connect the inner conductor to the phones hole. Tack solder the braid to the ground pad of R33. This pad is closest to the edge of the board. The other end will be connected later. At this time all components, wires and cables should be soldered to the board. Again, double check your work.



## CHASSIS ASSEMBLY

- 1) Refer to the TOP VIEW OF CHASSIS diagram. Remove any paint overspray from all holes on the inside of the chassis with a piece of sandpaper. From the bottom of the chassis, insert a 4-40 x 1/4" machine screw into hole "A". Place a #4 lockwasher on screw, then start a 3/8" threaded spacer on the screw and tighten finger tight. Repeat at holes B, C, D, G and H.
- 2) Place a #6 lockwasher on a 6-32 x 5/8" machine screw. From the inside of the rear panel insert the screw through hole "P". Place another #6 lockwasher on screw and then a #6 hex nut. Tighten securely.
- 3) Mount the air variable capacitor as follows: Place a #4 lockwasher on a 4-40 x 1/4" machine screw. Place the air variable capacitor inside the chassis so the shaft goes through hole "K" in the front panel. Line up the the machined #4 holes in the cap with holes "E" & "F" in the chassis and start the screw in hole "E". Start another 4-40 x 1/4" screw with lockwasher in hole "F". Leave these screws finger tight for now. Slide the dial mounting hub onto the shaft of the air variable cap. The smaller part of the hub with the hex set screw goes toward the cap. Look at the front panel and make sure the dial flange is centered in hole "K". Move the air variable cap until the flange is centered. The cap should be positioned as far back as its mounting holes will permit. Tighten the cap mounting screws securely. Remove the dial mounting hub.
- 4) Locate the 10K ohm, center detent pot, R14. Using your pliers, break off the small alignment tab. Remove the hardware from the pot. Install the pot in hole "I" in the front panel. Secure with the flat washer and nut supplied. Position the pot with the terminals facing up.
- 5) Locate the 50K ohm pot and bend the alignment tab out. Remove the hardware and install at hole "L" in front panel. Position pot so terminals are facing up. Secure with the flat washer and nut supplied.
- 6) Position the chassis so the front panel is facing you. Position the PC board over the six spacers with L4 toward the front. Route the 8" cable coming from "PHONES" at the rear of the board along the floor of the chassis and rear panel to the right and along the right side of the chassis to the front panel. The cable should be routed between the right chassis flange and the spacers mounted at holes B & C. Place a #4 lockwasher on a 4-40 x 1/4" machine screw. Start this screw into the spacer at hole B. Repeat at holes C, D, G, H and A. Turn the chassis over and tighten the screws at all six holes. Turn the chassis over again and tighten the six screws securing the PC board.
- 7) Bend the LARGE RED wire down so it engages the right rear terminal of the air variable cap, C5. Don't push the wire in too far, as it may short against the chassis. Solder the connection.
- 8) Very lightly tin the free ends of all the colored wires. Turn the chassis so the rear panel is facing you. Refer to the diagram at the right to identify the pot terminal lugs. Connect the following wires to the RIT pot (Pot mounted in hole I). Solder ORG wire to terminal #3. Solder BLU wire to terminal #2. Solder BLK wire to terminal #1.



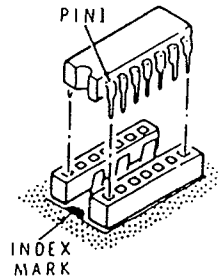
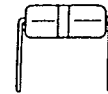
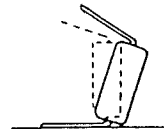
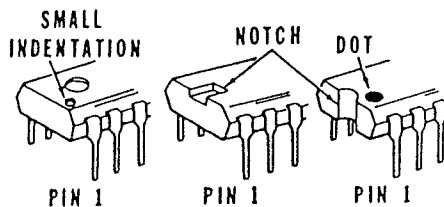
## CHASSIS ASSEMBLY (CONT)

- 9) Remove another 1/4" of insulation from the GREEN wire. Connect the following wires to the AF gain pot, R24 (Pot mounted in hole L). Insert the GRN wire through terminal #2 and then connect to terminal #3. Solder both terminals. Solder the BRN wire to terminal #1.
- 10) Locate the toggle switch and remove the knurl nut and one flat washer. Mount the switch in hole J. Position the switch so the terminals are vertically lined up. Solder the 5" YELLOW wire to the bottom terminal. The free end of this YEL wire will be connected shortly. Solder the RED wire to the center terminal.
- 11) Locate one of the 1/4" phone jack and remove hardware. Place a large control lockwasher on the bushing and mount jack in hole M in front panel. Position jack so the flat contact bar is on top and parallel with the chassis. With the rear panel facing you, solder the inner conductor of the BLACK coax cable to the left terminal of the jack. Solder the braid to the right terminal.
- 12) Install the SO-239 connector in hole U. The flange goes on the inside of the chassis. Line up the four holes. From the outside of the rear panel, insert a 4-40 x 5/16" machine screw through hole Q. Place a #4 solder lug on the screw and secure with a #4 hex nut. Repeat at holes R, S and T using a #4 lockwasher instead of a solder lug. With the front panel facing you, position the solder lug so it faces to the right. Tighten all four screws securely. Bend the solder lug forward at a 90 deg angle. Solder the free end of the short coax to the SO-239 connector. The inner conductor is soldered to the center pin and the braid to the solder lug. Position this cable back away from L2 and L3 as much as possible.
- 13) Locate the coaxial power jack. Remove the nut and lockwasher. Install the jack from the outside of the rear panel in hole O. Position the jack so the ground lug is up. Secure with the lockwasher and nut. Bend the ground lug up. Insert the mating plug in the jack. Solder the free end of the YELLOW wire to the center pin. Insert the UNBANDED end of a 1N4007 diode into the ground tab hole and solder. Solder the BANDED end to the center terminal pin. Trim leads.
- 14) Locate the other 1/4" phone jack and remove the hardware. Install a large control lockwasher on the bushing. Install the jack from the inside of the rear panel in hole N. Position the jack so the flat contact bar is on top and parallel with the chassis. Secure with the flat washer and nut. With the front panel facing you, solder the free end of the WHT wire to the left terminal of the jack.
- 15) Bundle all the colored wires together near the center of the board and about 1 1/4" above the board (just above Q11). Use a 4" plastic tie wrap and secure the bundle at this point. Use two more plastic ties to secure the wires going to the toggle switch and the RIT pot. Use another plastic tie to secure the RED, GRN and BRN wires going off to the right. Dress all wires away from the air variable capacitor by at least 2".

8.6.74  
NBS  
Wb

## CHASSIS ASSEMBLY (CONT)

- ✓ 16) Attach the plastic dial pointer to the dial mounting hub using 2-56 x 1/4" machine screws.
- ✓ 17) Turn the shaft of the main tuning cap fully counterclockwise. Slide the dial mounting hub onto the shaft. Position the pointer so the cursor line is lined up with the "0" mark on the front panel. Move the mounting hub forward just enough to prevent the pointer from rubbing on the front panel. Tighten the mounting hub hex set screw. Install the large knob on the main tuning capacitor shaft. The knob should be about 1/8" from the front panel. Install the two remaining knobs. Be sure the RIT pot is in its center detent position and the knob slot is lined up with the center hash mark.
- ✓ 18) Refer to the diagram below to prepare the IC's for installation into their sockets. Place one of the IC's on a wooden surface on its side with the pins flat. Roll the IC on the surface so as to make the pins 90 deg to the body of the IC. Do the same with the other row of pins. Repeat this procedure with the other three IC's. Install the IC's into their proper sockets. Be sure you have pin 1 in the proper place.



- ✓ 19) This completes the assembly of your kit. Double check your work to make sure everything is as it should be. The alignment will be performed next.

## ALIGNMENT (40M)

- 1) The only equipment needed to perform the alignment is a 10 MHz frequency counter and a QRP wattmeter and a 2W or better dummy load. Of course you will also need a source of power, either a battery or a well regulated 12V power supply capable of delivering 500 mA of current. DO NOT use a plug in the wall type transformer power unit. These units are generally not well filtered or regulated.
- 2) Locate the molded coaxial power cable assembly. Examine the end with the tinned leads. Notice that one of the leads has ribs or notches on it and the other has printing on it. The ribbed lead is POSITIVE and the printed lead is NEGATIVE. You may trim the wires to a shorter length if desired. Attach the cable assembly to your power source.
- 3) Apply power to the radio and turn the power switch to the on position. Allow the radio to warm up for 30 minutes before doing alignment. Hook your frequency counter to the wire at TP (just to the left of R5).
- 4) When making adjustments to the three slug tuned coils, use the proper alignment tool. DO NOT use a metal tool, as this will break the core material. A small metal screwdriver can be used on C1 and C13.
- 5) Be sure the RIT pot is in its center detent position. Turn the main tuning knob to "0". Adjust L4 for a frequency of 7000 KHz. Turn main tuning to "100" and adjust C1 for a frequency of 7100 KHz. Again, turn the main tuning to "0" and adjust L4 for a frequency of 7000 KHz. Turn the main tuning to "100" and adjust C1 for a frequency of 7100 KHz. Continue this procedure until the band edges are at 7000 KHz and 7100 KHz. You will notice each time you do the procedure you will get a little closer to the desired result. The core of L4 should end up protruding out of the top of the coil by a few threads. This will give you 100 KHz of coverage. Once the VFO is adjusted correctly, disconnect the frequency counter.
- 6) Connect your QRP wattmeter to the antenna jack. Be sure you have a 50 ohm dummy load connected to the wattmeter. Set the wattmeter to the 2W or 5W scale. Turn R5 fully clockwise (toward rear of radio). Now rotate R5 1/4 turn. Attach your key to the key jack. Key radio and adjust C13 for maximum power output. Adjust R5 for 1.5W output.
- 7) Attach a 50 ohm antenna to the antenna jack. Plug in your 8 ohm headphones, adjust the AF gain pot to a comfortable level. Tune in a signal at about 50 on the dial and adjust coils L6 and L7 for maximum signal. This completes the alignment.
- 8) Install the cabinet cover using the four black 1/4" sheet metal screws. Install the four rubber cabinet feet on the bottom of the chassis.

COMPLETED BUILDING  
8-6-74  
AGSP

## OPERATION

As with all Direct Conversion Receivers, you will hear the same signal on both sides of zero beat. Always tune in a signal on the lower side of zero beat. In other words, as you tune up the band from "0" on the dial and hear a signal, this signal is on the lower side. This is the correct side. If you continue tuning on this signal you would pass through zero beat and start hearing the same signal on the upper side of zero beat. This would be the wrong side to tune this signal in on. Of course, if you had started tuning down the band from "100" on the dial toward "0", then the opposite would be true. In this case you would move through zero beat and tune in the signal on the lower side. Always tune on the side closest to "0".

The RIT is enabled on receive only and therefore will not affect the transmit frequency. The RIT pot should be in the center detent position when not in use.

The receiver uses very high gain amplifiers in the audio circuit. Use only enough AF gain for comfortable audio.

Thank you for purchasing the QRP Sprint transceiver kit. We hope you have enjoyed building the kit and it will provide many years of trouble free service.

Oak Hills Research

# PARTS LIST (40M)

- ✓ ~~C1, C18~~ - 60pF TRIM CAP (ORG)
- C2 - 40pF AIR VARIABLE CAPACITOR now USED
- ✓ ~~C3, C5~~ - 18pF NP0 MONO CAP (180) NOTE: C3 IS NO LONGER USED
- ✓ ~~C4, C6, C10, C16, C19, C22, C24, C25, C26, C29, C33, C34, C36, C31, C36~~ - .1uF MONO CAP (104) <sup>(15)</sup>
- ✓ ~~C20, C35~~ - 33pF NP0 MONO CAP (330) -
- ✓ ~~C7, C38, C39, C40~~ - 10uF ELECTROLYTIC CAP
- ✓ ~~C8~~ - 150pF NP0 MONO CAP (151)
- ✓ ~~C9, C11, C17~~ - 560pF NP0 MONO CAP (561)
- ✓ ~~C12, C27, C31~~ - .01uF MONO CAP (103) (ON TAPE)
- ✓ ~~C14~~ - 270pF S.M. CAP (271)
- ✓ ~~C15~~ - 51pF GER DISC CAP (510)
- ✓ ~~C16~~ - 680pF S.M. CAP (681)
- ✓ ~~C17~~ - 330pF S.M. CAP (331)
- ✓ ~~C21, C24, C26, C28~~ - .001uF MONO CAP (102)
- ✓ ~~C23~~ - 1uF ELECTROLYTIC CAP
- ✓ ~~C24, C25~~ - 220pF NP0 MONO CAP (221)
- ✓ ~~C26, C27~~ - 24pF NP0 MONO CAP (240)
- ✓ ~~C28, C29~~ - 910pF NP0 MONO CAP (911)
- ✓ ~~C38, C41~~ - 100uF ELECTROLYTIC CAP
- ✓ ~~C40, C42, C43~~ - 10uF ELECTROLYTIC CAP
- ✓ ~~C48~~ - 33uF ELECTROLYTIC CAP
- ✓ ~~C50~~ - .047uF MONO CAP (473)
- ✓ ~~C53~~ - .033uF POLYESTER CAP (333)
- ✓ ~~C55~~ - .033uF POLYESTER CAP (223)
- ✓ ~~D1, D2, D3, D6, D8, D9, D10, D11, D12~~ - 1N4148 SILICON DIODE
- ✓ D2 - 33V 1W ZENER DIODE (1N4752)
- ✓ D5 - 15V ZENER DIODE (1N5245B)
- ✓ D7 - 10V ZENER DIODE (1N5240B)
- D13 - 1N4007 SILICON DIODE
- J1 - SO-239 ANTENNA CONNECTOR
- J2, J3 - 1/4" STANDARD PHONE JACK
- ✓ ~~L1~~ - 15uH CHOKE (BRN-GRN-BLK)
- L2, L3 - PRE-WOUND COIL
- ✓ ~~L4~~ - 1.0uH SLUG-TUNED INDUCTOR (STYLE 3)
- ✓ L5 - 10uH CHOKE (BRN-BLK-BLK)
- ✓ ~~L6, L7~~ - 3.3uH SLUG-TUNED INDUCTOR (9445)
- ✓ L8 - 100uH CHOKE (BRN-BLK-BRN)

# PARTS LIST (40M)

Q1 - J310 JFET

Q2,Q3,Q7,~~Q8~~,Q11 - 2N3904 TRANSISTOR

Q4 - 2N2222A TRANSISTOR

Q5 - 2N3553 TRANSISTOR

Q6,Q8 - 2N3906 TRANSISTOR

Q10 - MPF102 - JFET

✓ R1 - 100 Ohm 1/4W RES (BRN-BLK-BRN)

✓ R2,R46 - 27K Ohm 1/4W RES (RED-VIO-ORG)

✓ R3,R19,R26,R36 - 100K Ohm 1/4W RES (BRN-BLK-YEL)

✓ R4,R9,R17,R18,R20,R34,R37,R44,R45 - 10K Ohm 1/4W RES (BRN-BLK-ORG)

✓ R5 - 1K Ohm PC TRIM POT (102)

✓ R6,R16,R29,R35,R39 - 1K Ohm 1/4W RES (BRN-BLK-RED)

✓ R7,R43 - 4.7K Ohm 1/4W RES (YEL-VIO-RED)

✓ R8 - 33 Ohm 1/4W RES (ORG-ORG-BLK)

✓ R10 - 180 Ohm 1/4W RES (BRN-GRY-BRN)

✓ R11,R38 - 10 Ohm 1/4W RES (BRN-BLK-BLK)

✓ R12,R32,R40,R42 - 1M Ohm 1/4W RES (BRN-BLK-GRN)

✓ R13 - 390 Ohm 1/4W RES (ORG-WHT-BRN)

✓ R14 - 10K Ohm PANEL MOUNT POT - CENTER DETENT

✓ R15 - 56K Ohm 1/4W RES (GRN-BLU-ORG)

✓ R21 - 1.8K Ohm 1/4W RES (BRN-GRY-RED)

✓ R22 - 47 Ohm 1/4W RES (YEL-VIO-BLK)

✓ R23 - 300K Ohm 1/4W RES (ORG-BLK-YEL)

✓ R24 - 50K Ohm PANEL MOUNT POT (B50K)

✓ R35 - 2.2K Ohm 1/4W RES (RED-RED-RED)

✓ R27 - 2.7K Ohm 1/4W RES (RED-VIO-RED)

✓ R28,R30 - 12K Ohm 1/4W RES (BRN-RED-ORG)

✓ R31 - 36K Ohm 1/4W RES (ORG-BLU-ORG)

✓ R41 - 51 Ohm 1/4W RES (GRN-BRN-BLK)

✓ R48 - 39K Ohm 1/4W RES (ORG-WHT-ORG)

✓ RFE1 - 100uH CHOKE (BRN-BLK-BRN)

S1 - SPDT TOGGLE SWITCH

T1 - PRE-WOUND TRANSFORMER

T2 - PRE-WOUND TRANSFORMER

U7 - TUF-1 MINI-CIRCUITS MIXER

U12 - LM301AN IC

U13 - LM386 IC

U14,U16 - LM358N IC

✓ R25 - 1.5K Ohm 1/4W RES (BRN-GRN-RED)

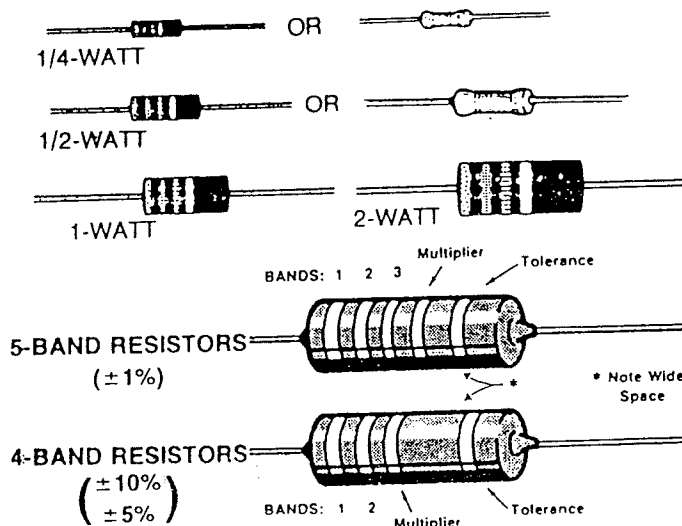
✓ R47 - 1.5M Ohm 1/4W RES (BRN-GRN-GRN)

## PARTS LIST (40M)

- 1) TO-39 HEATSINK
- 4) 8 PIN IC SOCKET
- 1) PC BOARD (40-0106)
- 1) CABINET W/COVER
- 1) COAXIAL POWER JACK
- 1) MOLDED POWER PLUG ASSY
- 1) KNOB SET (1 LARGE & 2 SMALL)
- 1) DIAL MOUNTING HUB
- 1) DIAL POINTER
- 1) WIRE PACK
- 1) HARDWARE PACK
- 1) SET OF INSTRUCTIONS



## RESISTORS & CHOKES



Band 1 1st Digit		Band 2 2nd Digit		Band 3 (if used) 3rd Digit		Multiplier		Resistance Tolerance	
Color	Digit	Color	Digit	Color	Digit	Color	Multiplier	Color	Tolerance
Black	0	Black	0	Black	0	Black	1	Silver	$\pm 10\%$
Brown	1	Brown	1	Brown	1	Brown	10	Gold	$\pm 5\%$
Red	2	Red	2	Red	2	Red	100	Brown	$\pm 1\%$
Orange	3	Orange	3	Orange	3	Orange	1,000		
Yellow	4	Yellow	4	Yellow	4	Yellow	10,000		
Green	5	Green	5	Green	5	Green	100,000		
Blue	6	Blue	6	Blue	6	Blue	1,000,000		
Violet	7	Violet	7	Violet	7	Silver	0.01		
Gray	8	Gray	8	Gray	8	Gold	0.1		
White	9	White	9	White	9				

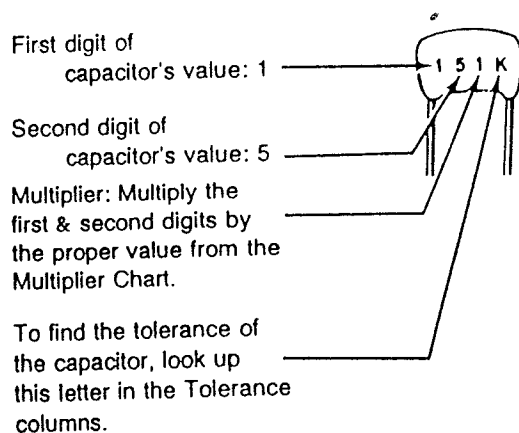
### EXAMPLES:

$$151K = 15 \times 10 = 150 \text{ pF}$$

$$759 = 75 \times 0.1 = 7.5 \text{ pF}$$

NOTE: The letter "R" may be used at times to signify a decimal point: as in: 2R2 = 2.2 (pF or  $\mu\text{F}$ ).

## CAPACITORS



MULTIPLIER		TOLERANCE OF CAPACITOR		
FOR THE NUMBER:	MULTIPLY BY:	10 pF OR LESS	LETTER	OVER 10 pF
0	1	$\pm 0.1 \text{ pF}$	B	
1	10	$\pm 0.25 \text{ pF}$	C	
2	100	$\pm 0.5 \text{ pF}$	D	
3	1000	$\pm 1.0 \text{ pF}$	F	$\pm 1\%$
4	10,000	$\pm 2.0 \text{ pF}$	G	$\pm 2\%$
5	100,000		H	$\pm 3\%$
			J	$\pm 5\%$
8	0.01		K	$\pm 10\%$
9	0.1		M	$\pm 20\%$

## 1 YEAR LIMITED WARRANTY

**PARTS** - Replacements for defective parts will be supplied free of charge for a period of one year from the date of purchase. Replacement parts are warranted for the remaining portion of the original warranty period. If you do have a defective part, you may obtain a replacement by writing or calling us at (616) 796-0920. We will pay the shipping charges on these parts.

**SERVICE LABOR** - For a period of one year from the date of purchase, any malfunction caused by defective parts will be corrected at no charge to you. You must deliver the unit at your expense to Oak Hills Research. This warranty does not cover the corrections of assembly errors or any damage incurred during assembly of the unit.

**TECHNICAL CONSULTATION** - You will receive free consultation on any problem you may encounter in the assembly or use of our product. Just give us a call at (616) 796-0920, we will be glad to assist you.

**NOT COVERED** - The correction of assembly errors, adjustments, calibration, damage due to misuse, abuse or negligence are not covered by this warranty. Use of corrosive solder will void this warranty in its entirety. This warranty does not include reimbursement for inconvenience, loss of use or customer assembly.

This warranty covers only Oak Hills Research products and is not extended to other equipment or components that a customer uses in conjunction with our products.

**EFFECTIVE WARRANTY DATE** - Warranty begins on the date of first consumers purchase. Please supply a copy of your invoice when you request warranty service or parts.

**SHIPPING UNITS** - When shipping a unit back to us for repair, use adequate packing material. Damage due to inadequate packing cannot be repaired under this warranty.

**OAK HILLS RESEARCH**  
20879 Madison Street  
Big Rapids, MI 49307  
(616) 796-0920

## ADDENDUM

The following steps must be performed in order for the transceiver to operate correctly.

1) There are two cut traces on the solder-side of the board. These cuts have been made to correct errors in the board layout. The first cut is near C49. When you install cap C49, DO NOT cut off the negative lead. The negative lead is the shorter of the two leads. Bend this lead down and solder it to the NEAREST pad where resistor R41 is soldered. The correct R41 resistor pad to solder to is the one closest to R22 and C24. As you look down on the component side of the board, this would be the right lead of R41. Cut off excess lead length. Refer to the component parts overlay diagram.

2) The second cut trace is located near C36 and Q9. When you install cap C36, do not cut the positive (+) lead flush with the board. Instead, leave about 1/8" of the lead. Then bend this 1/8" lead down and solder it to the center (base) pad of transistor Q9. The positive lead of C36 is the LONGER of the two leads. Refer to the component parts overlay.

3) When you install and solder resistor R7, do not cut off the left lead. This lead is the one closest to C23. Cut the lead to 1/2". Slip a 1/4" piece of insulation from a piece of hook-up wire onto the lead. Bend the lead down and solder it to the ground lead of C18. The correct C18 lead is the one closest to Q5. Refer to the component parts overlay.

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